

Figure 1. Map of the eastern Pacific indicating the location of the Galápagos Rift 2002 Expedition field area, the Galapagos Islands, and the East Pacific Rise.

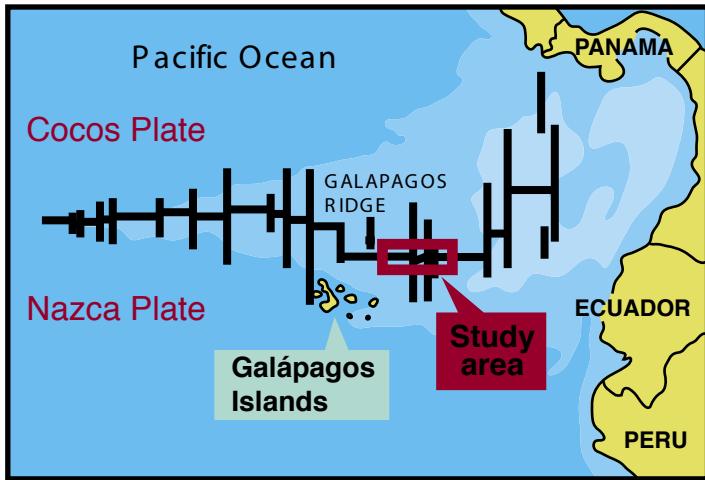


Figure 2. Location map of the Galápagos Rift showing the region between 86W and 89.5W that was investigated during the May-June 2002 NOAA Ocean Exploration cruise using Alvin and ABE (AT7-13).

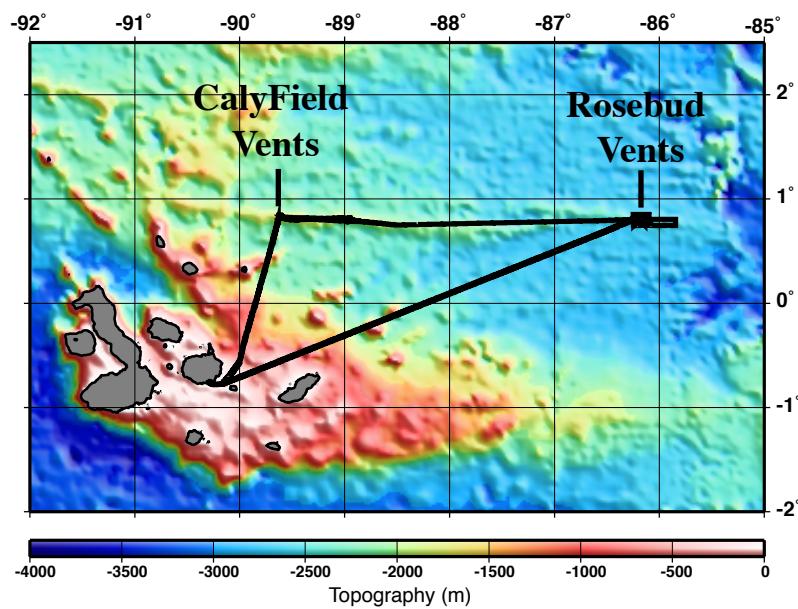


Figure 3. Regional bathymetric map showing the ship's track for AT7-13 and the location of Rosebud and Calyfield vents.

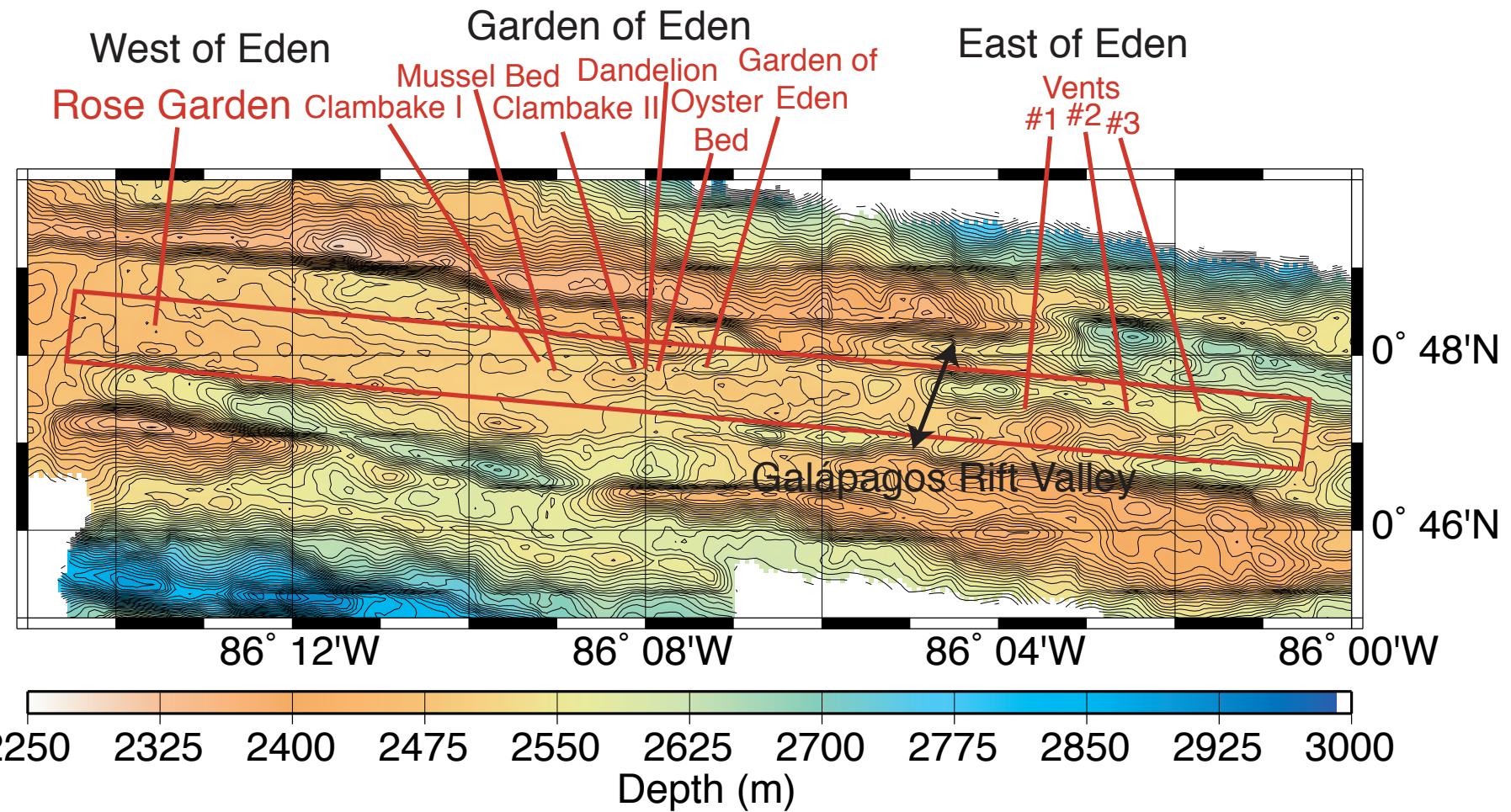


Figure 4. Multibeam bathymetry from Canales et al., [JGR (102), 1997] for the area around the originally discovered hydrothermal vents found at the Galápagos Rift in 1977. Data gridded at 100m and 20m contour intervals. The red box outlines areas of previous low-temperature venting and animal communities (labeled following nomenclature of Corliss et al., [Science, (203), 1979]).

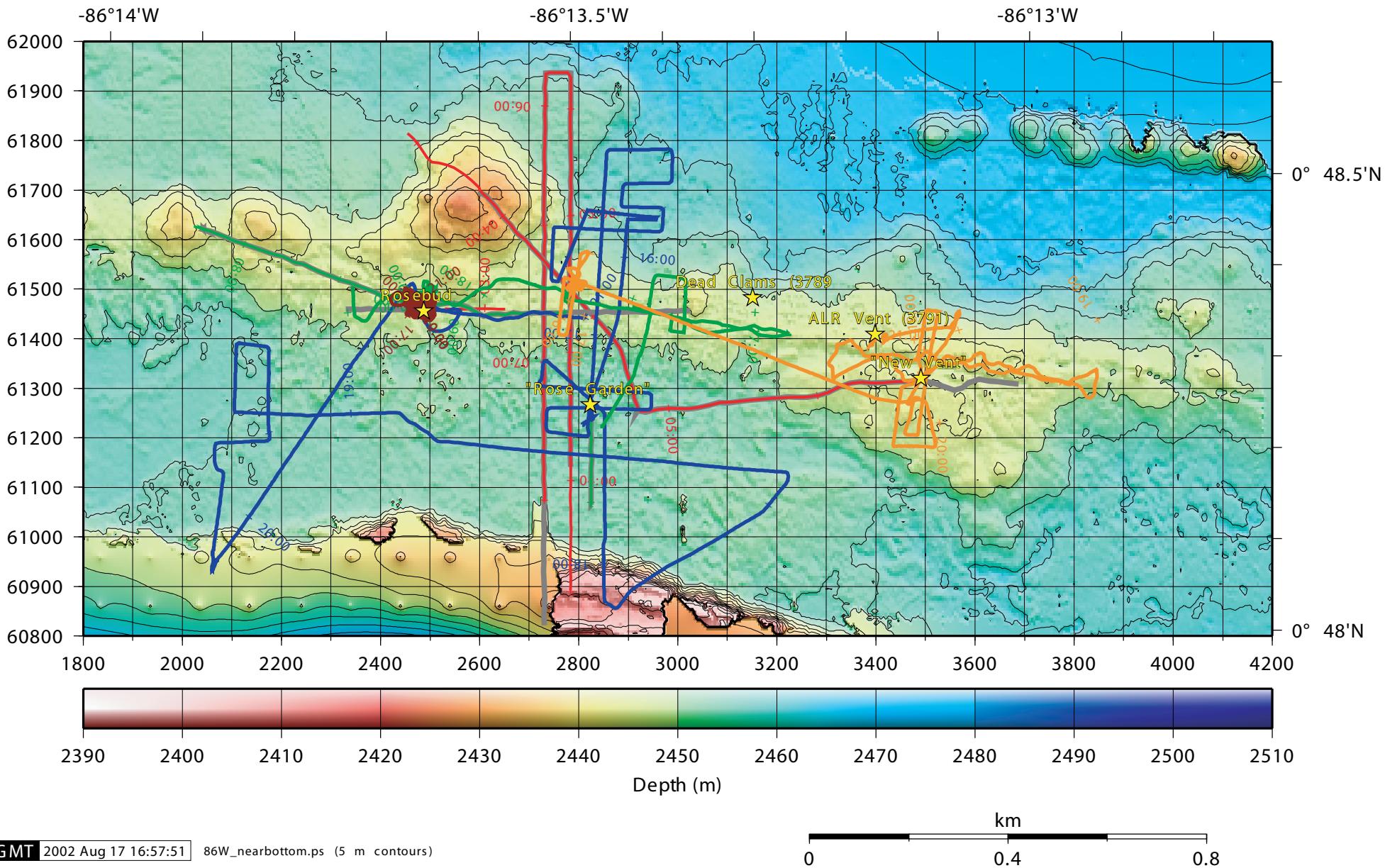


Figure 5. ABE microbathymetry from surveys using the Imagenex 675kHz scanning sonar. Data provide 5m horizontal resolution and 1m vertical resolution. A new vent site, Rosebud, was discovered, surveyed, and sampled. A smaller active site and a site marked by dead clams are noted. Dark blue line is the track of Alvin dive 3788; dark green=3789; dark red=3790; orange=3791. Alvin navigation represents doppler positions, as re-set with LBL positions by the Alvin Pilot during the dive. Red lines indicate the path of the camera sled across the seafloor; green lines indicate CTD tows.

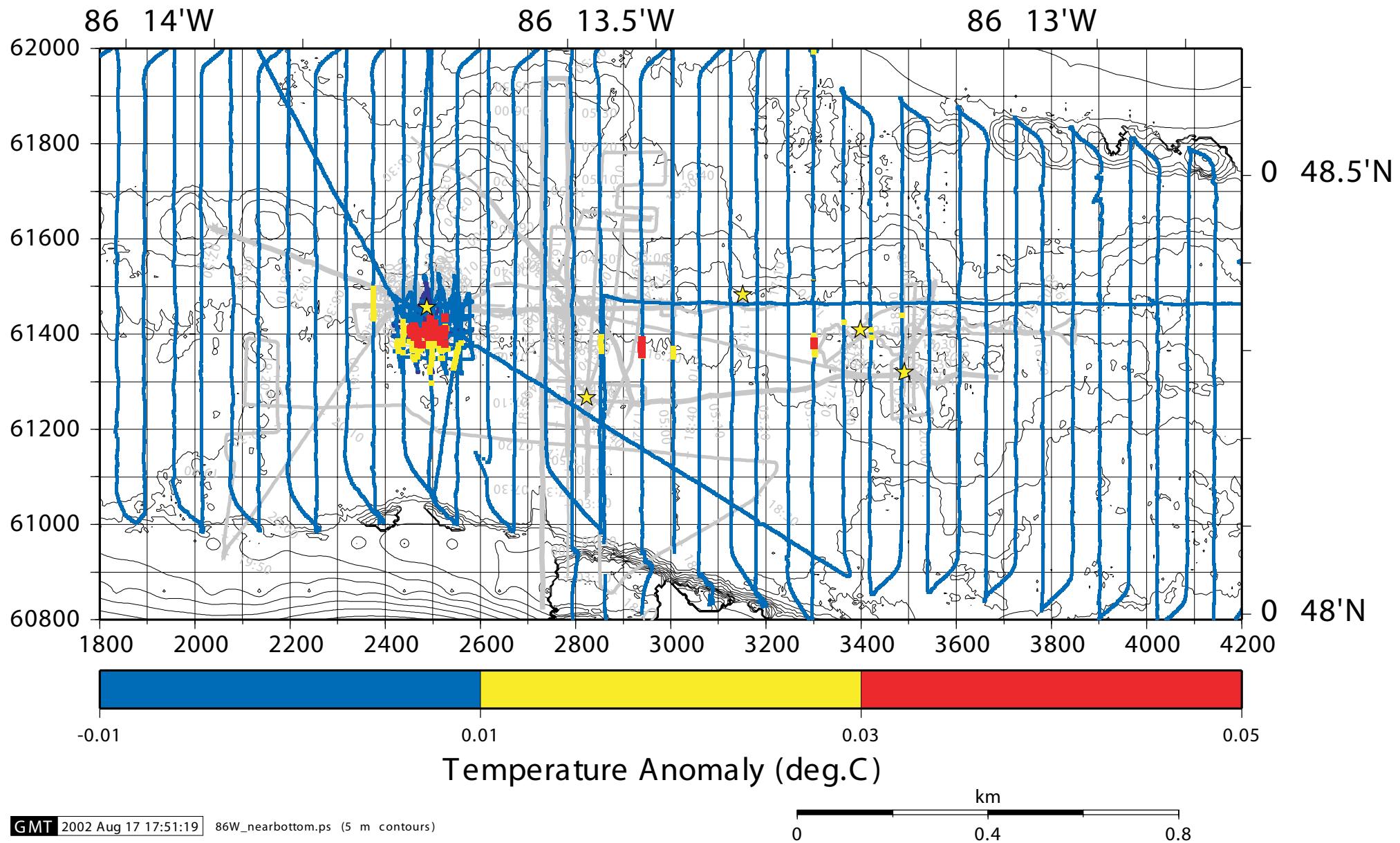


Figure 6. Temperature anomalies in the 86W area recorded by ABE. The westernmost star indicates the Rosebud Vent area. These data conclusively show that Rose Garden no longer exists.

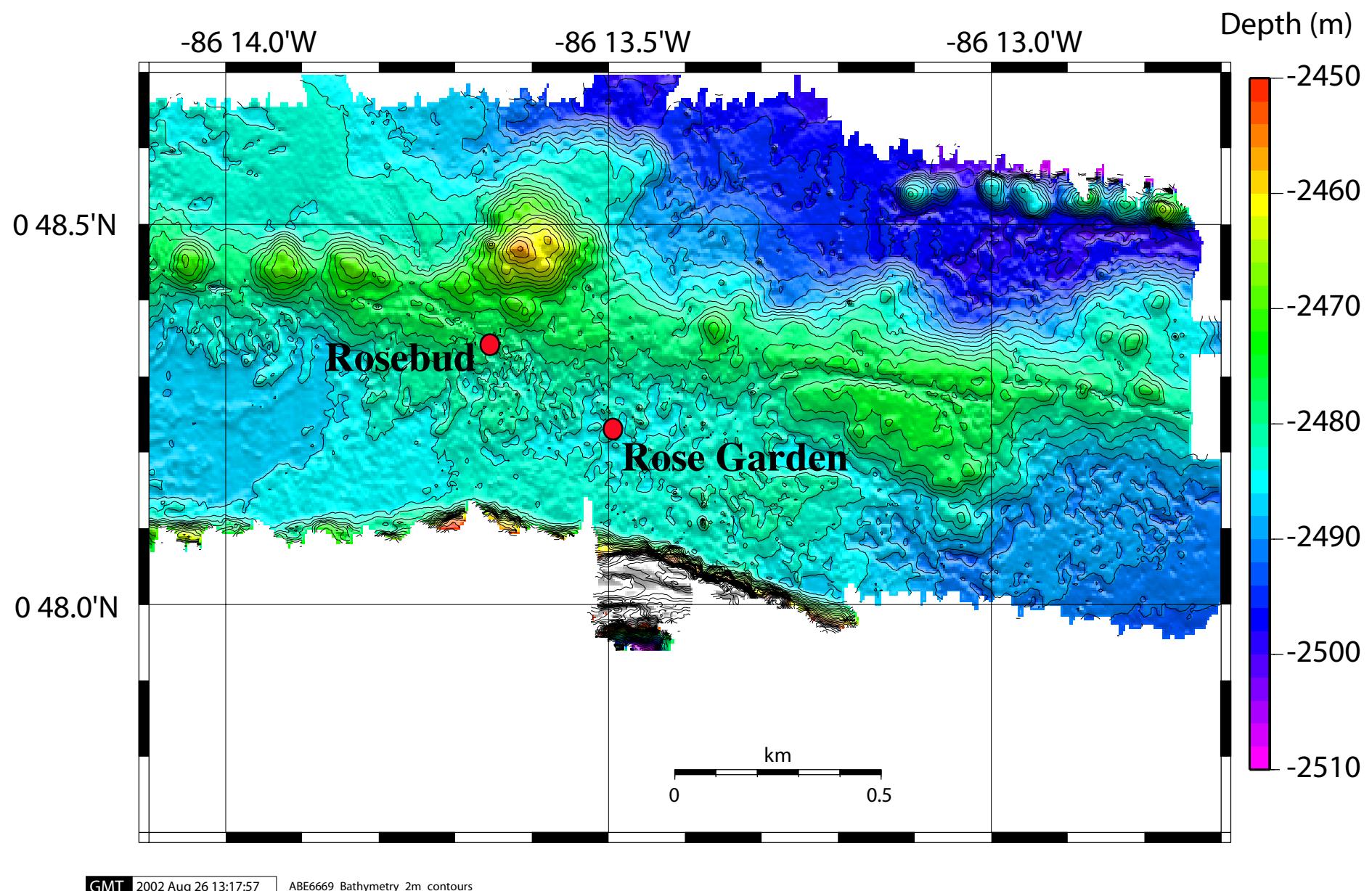
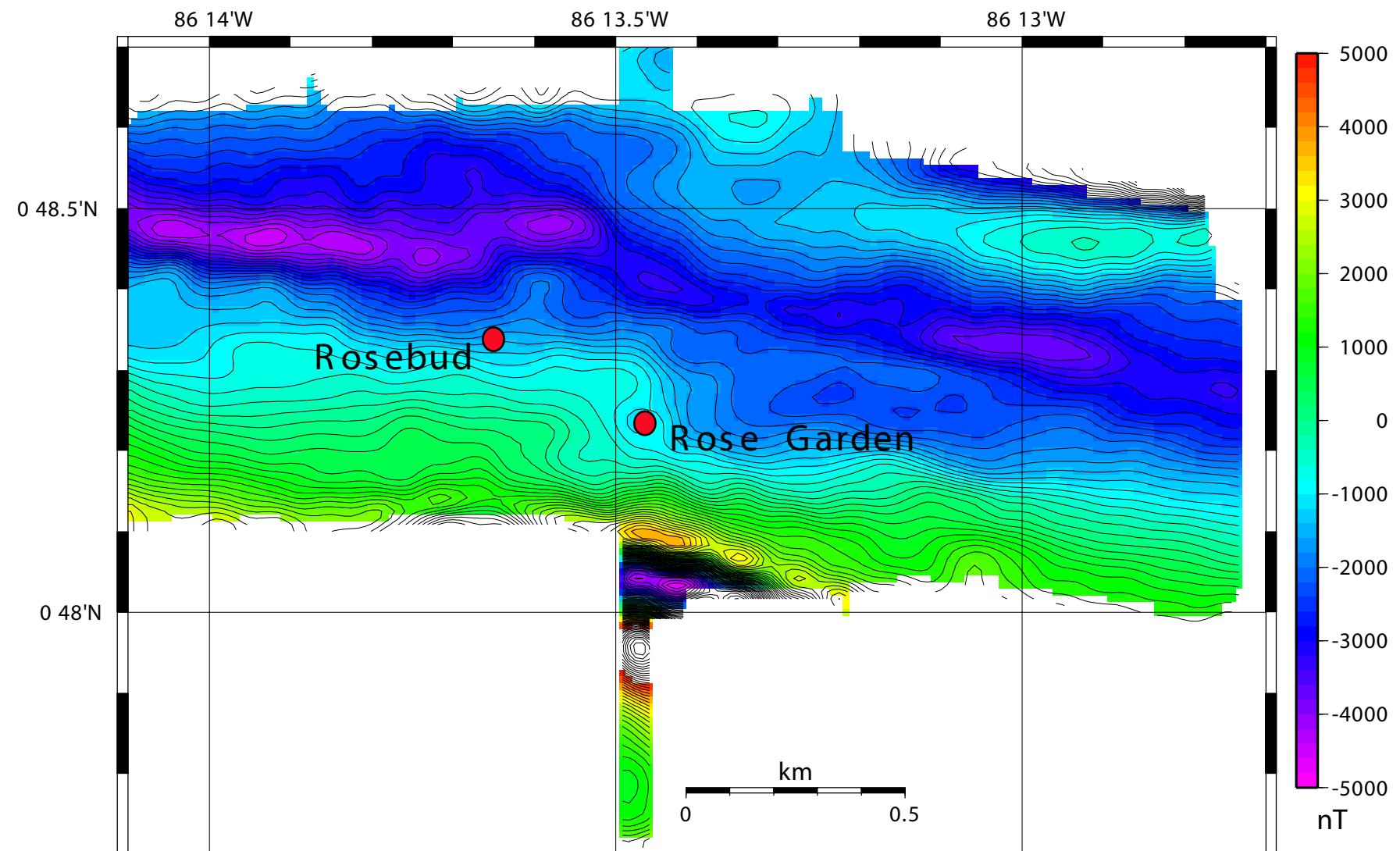
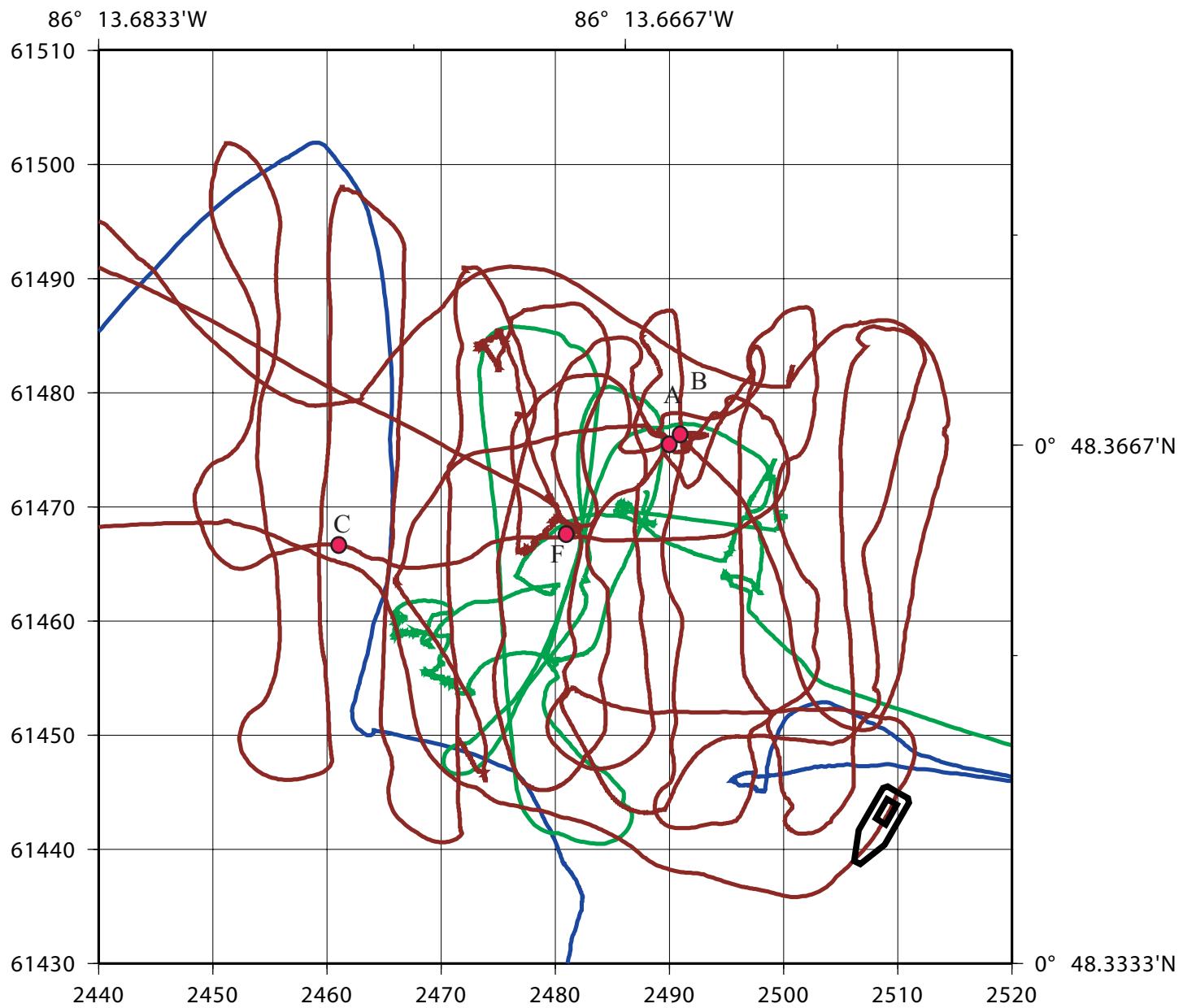


Figure 7. Microbathymetry of the 86W area from ABE Imagenex surveys. The old Rose Garden and the new Rosebud vent areas are shown.



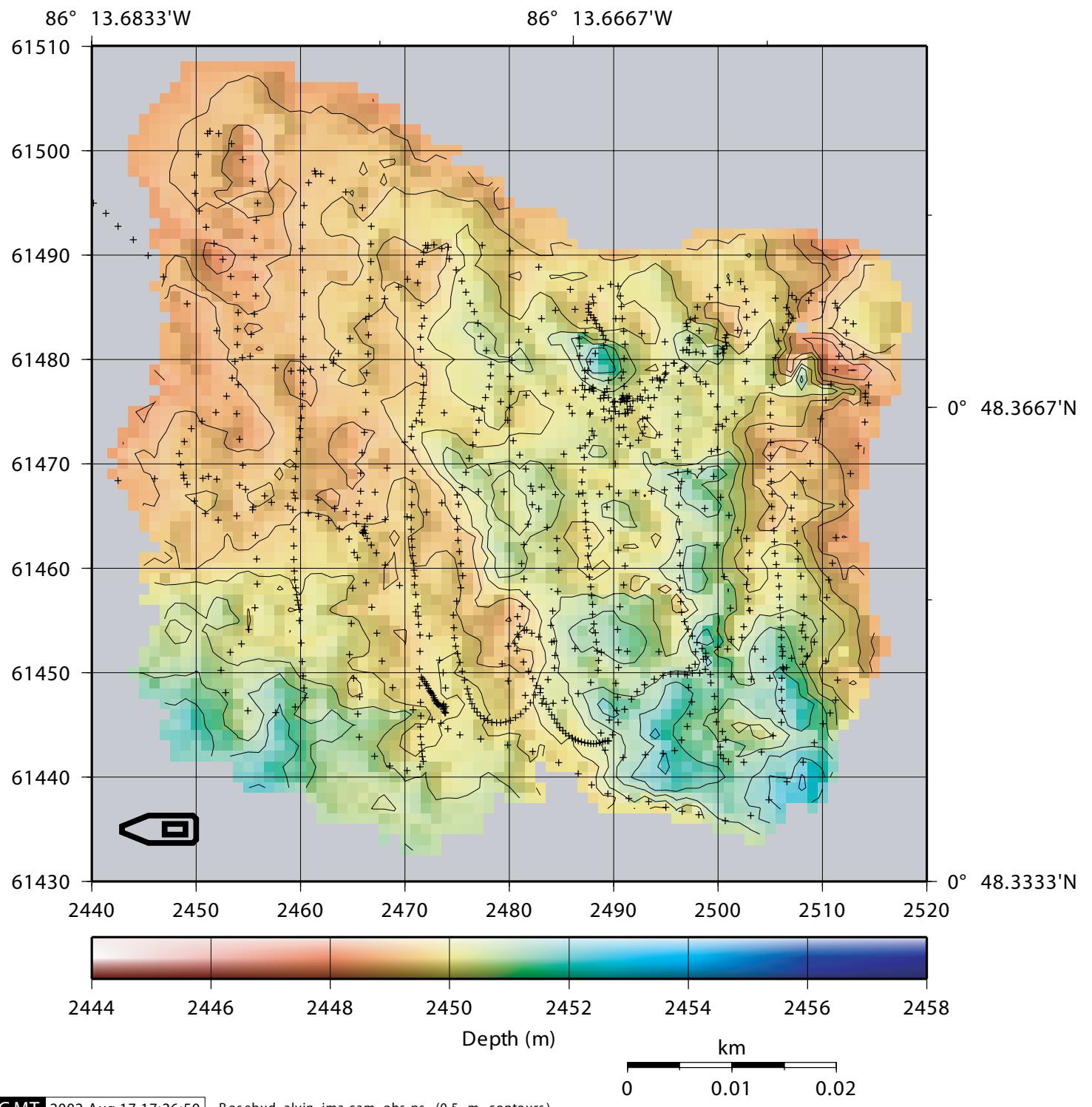
GMT 2002 Aug 26 13:22:16 ABE6669_Upon Magnetic Field_200_nt_contours

Figure 8. Seafloor magnetics of the 86W area collected during ABE dives. The upward continual magnetic data indicate that there has never been any high temperature venting in the area (M. Tivey, pers. comm., 2002).



GMT 2002 Aug 17 17:09:37 Rosebud.ps

Figure 9. Alvin tracks of three dives that visited the newly-discovered Rosebud low-temperature vent field. Approximate seafloor markers positions are shown. Dark blue line is the track of Alvin dive 3788; dark green=3789; dark red=3790. Alvin tracks were re-navigated by James Kinsey and Louis Whitcomb (Johns Hopkins University) by matching the doppler positions to reliable LBL fixes, when the submersible was in the Rosebud area. Black polygon approximates the outline of Alvin.



GMT 2002 Aug 17 17:26:50 Rosebud_alvin_ima.cam_obs.ps (0.5 m contours)

Figure 10. Photographic survey of the Rosebud Vent area conducted during dive 3790. Each cross represents a photograph taken using a DSPL downlooking DigiSeaCam mounted on Alvin. Lighting for each photo was provided by two 300watt/sec Benthos strobes.

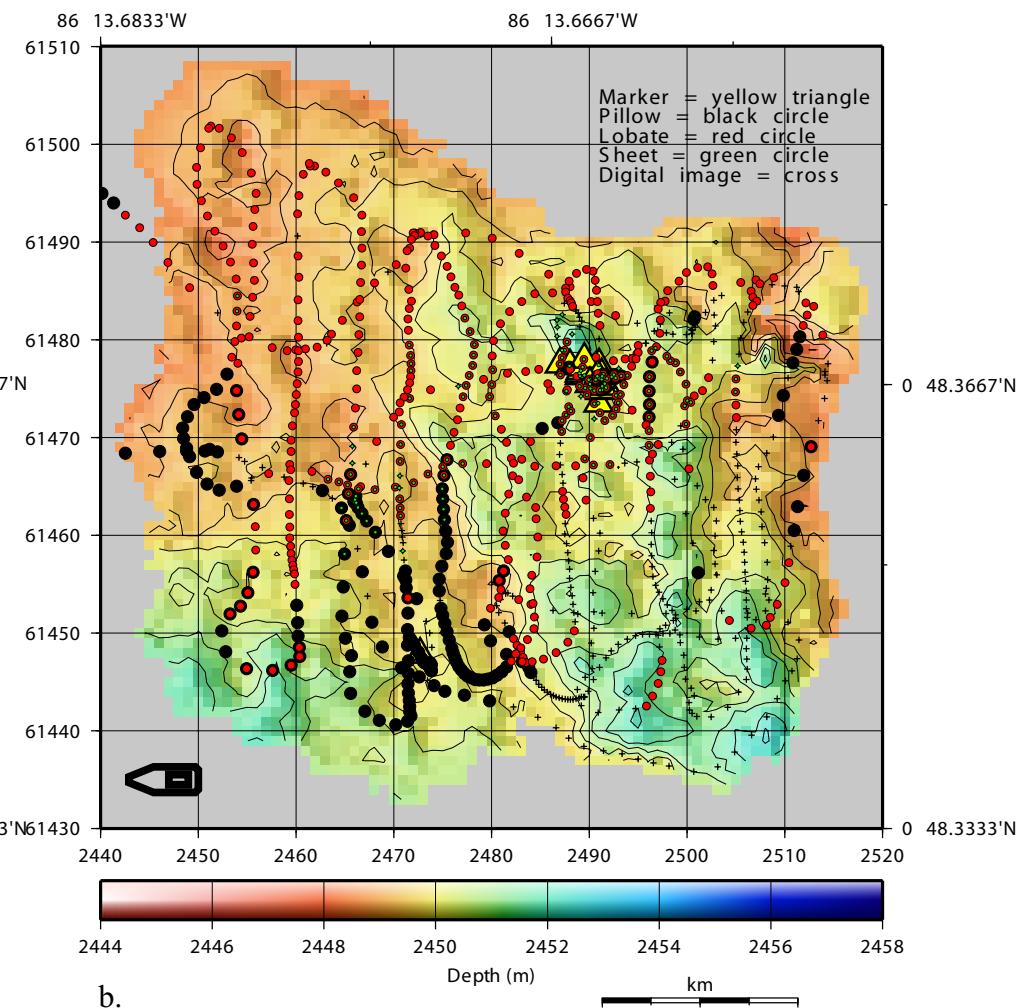
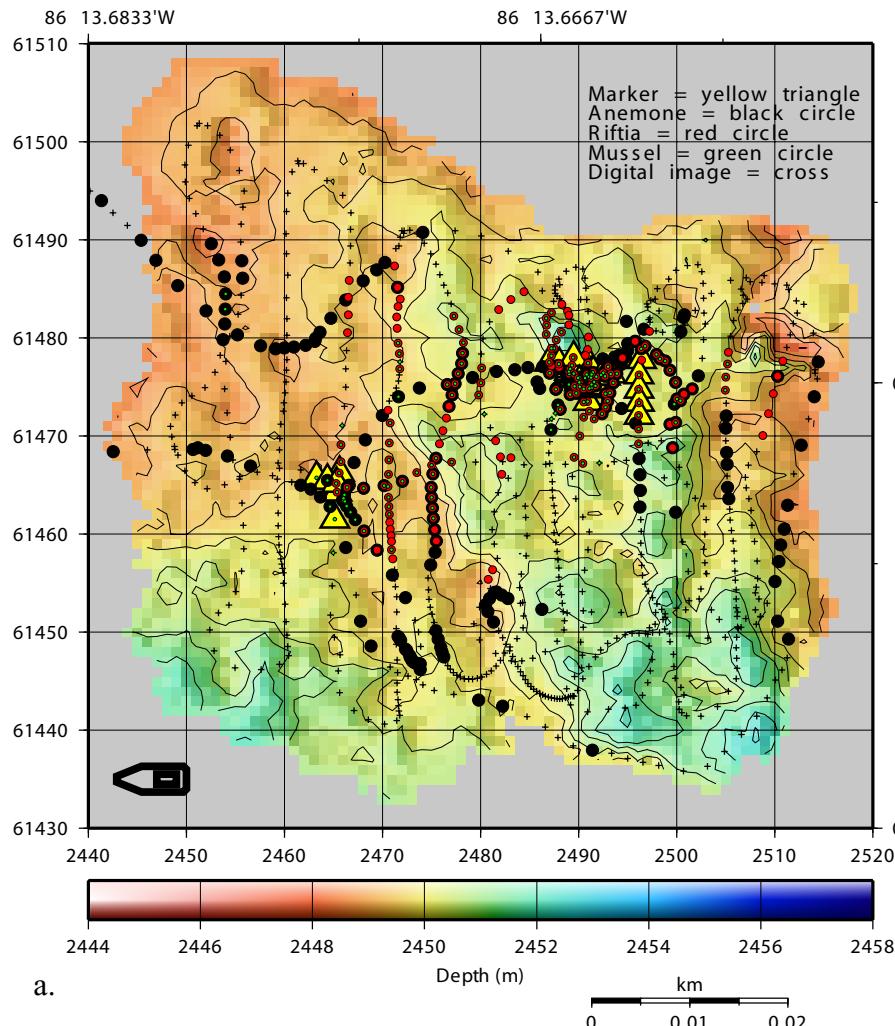
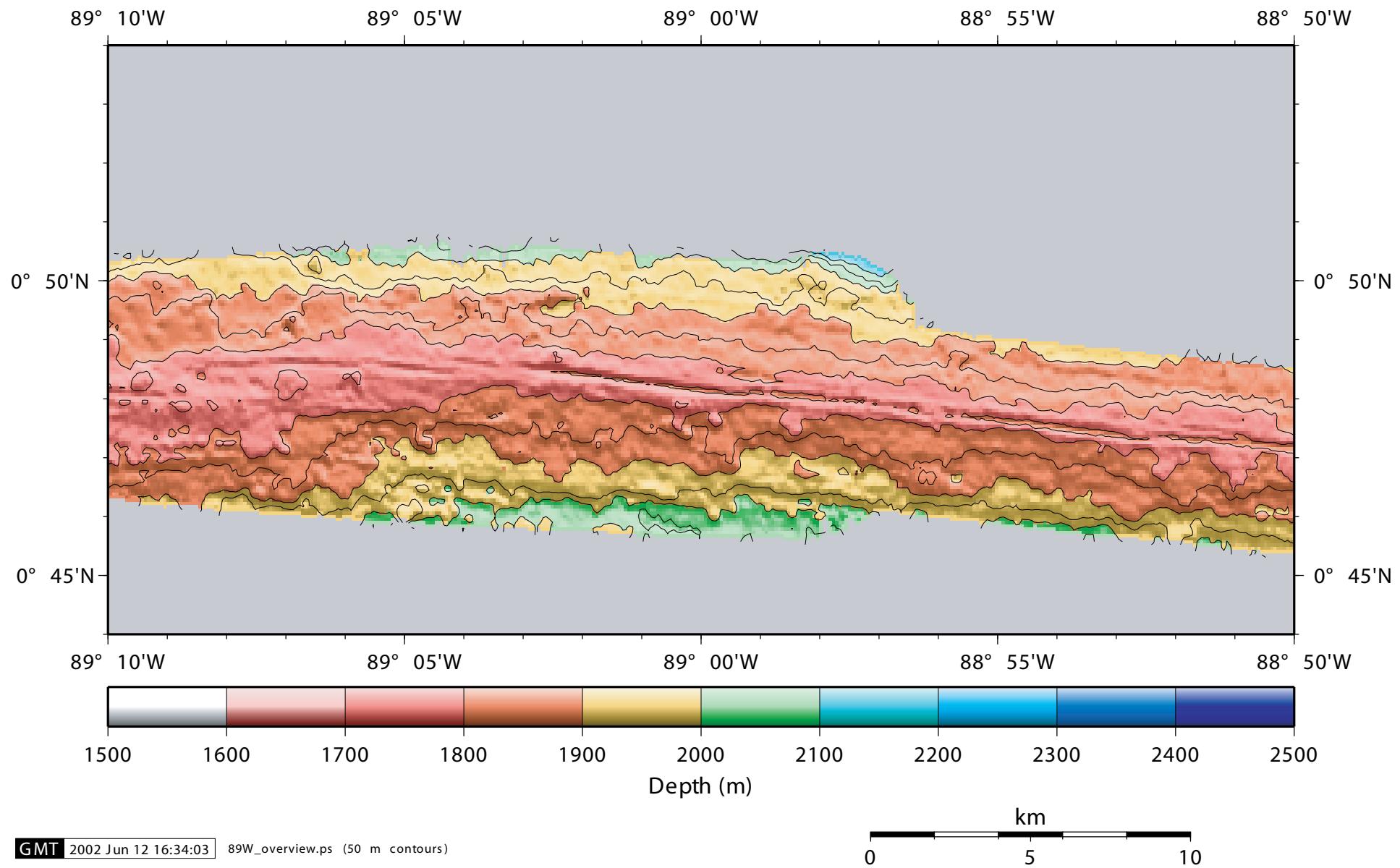
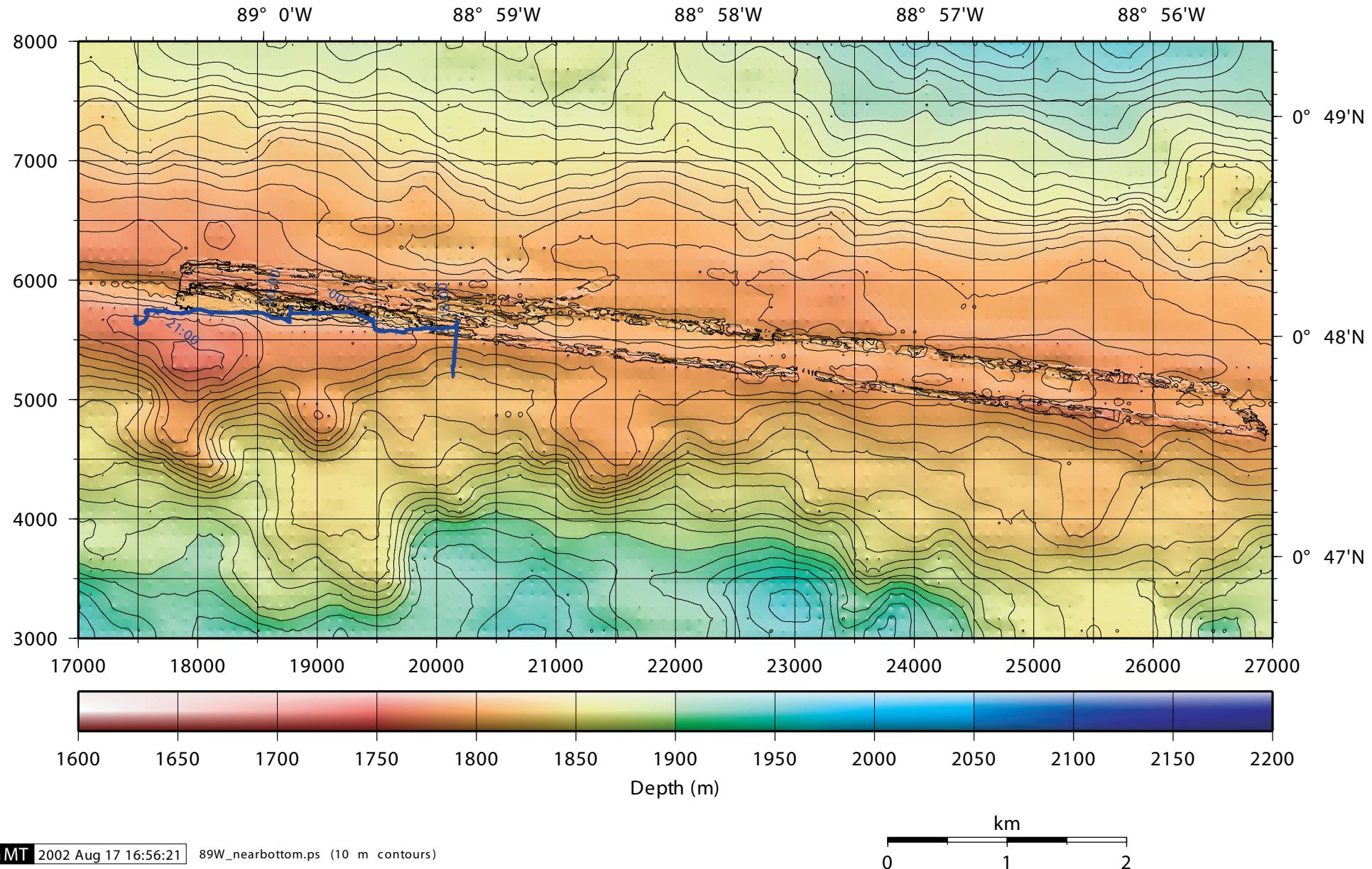


Figure 11. Preliminary compilation of biological features (a.) and geological features (b.) in the Rosebud Vent area based on analysis of digital images from the down-looking DSPL digital camera on Alvin dive 3790. The black polygon approximates the outline of Alvin.



GMT 2002 Jun 12 16:34:03 89W_overview.ps (50 m contours)

Figure 12. Seabeam2100 map of the Galapagos Spreading Center in the 89W area. Morphology of the Galapagos Rift here consists of a broad axial high, split by a ~30m deep by 500m wide axial trough.



GMT 2002 Aug 17 16:56:21 89W_nearbottom.ps (10 m contours)

Figure 13. ABE Imagenex swaths superimposed onto lower-resolution Seabeam2100 data. Alvin dive 3792 is shown in blue. Alvin navigation represents doppler positions, as re-set with LBL positions by the Alvin Pilot during the dive. CTD tow #3 was conducted just east of this area.

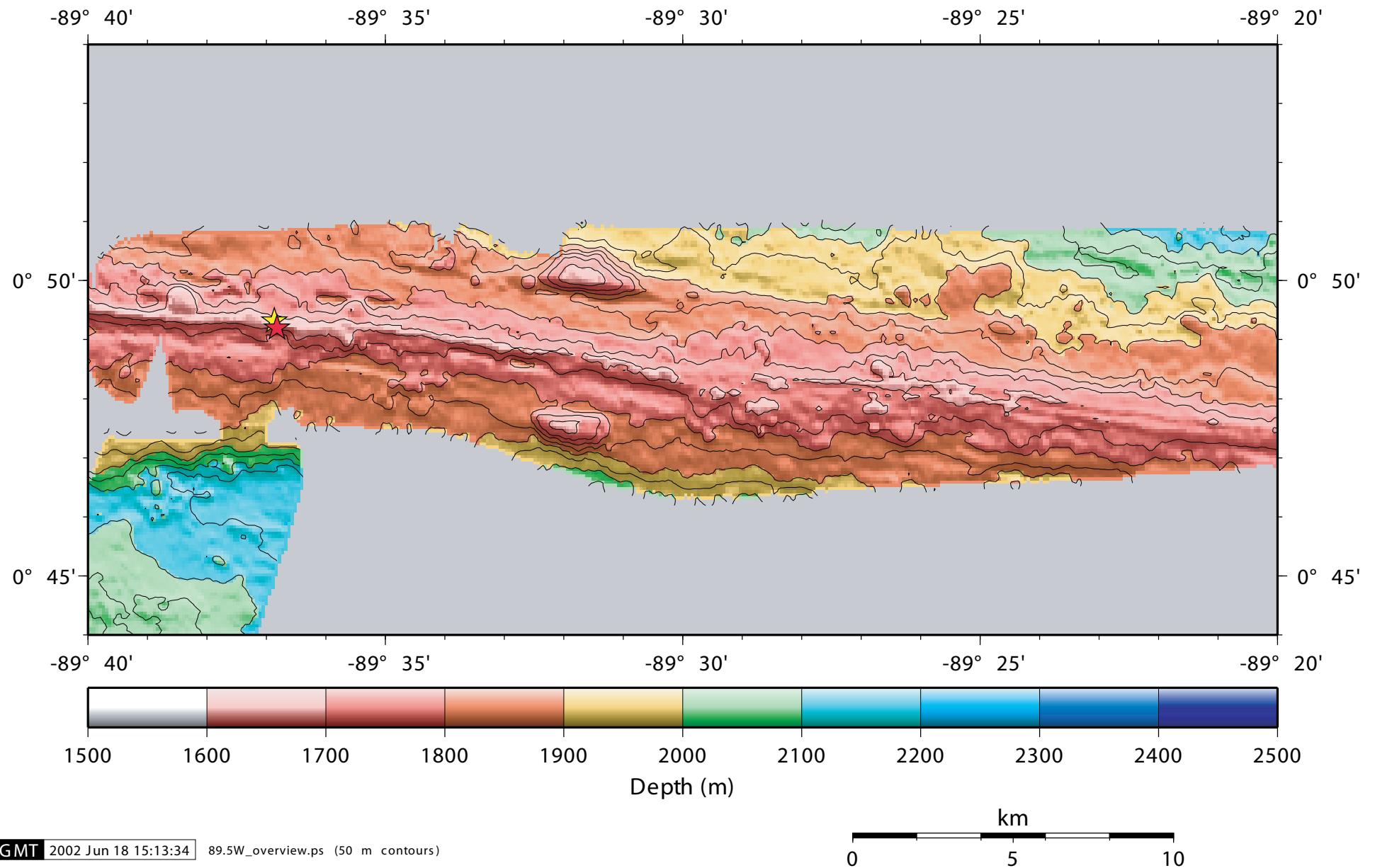


Figure 14. Seabeam2100 bathymetry data of the 89.5W area. The newly-discovered Calyfield, a diffuse vent site, is indicated by a red star. The yellow star shows the location of an extinct sulfide chimney and dead mussel field.

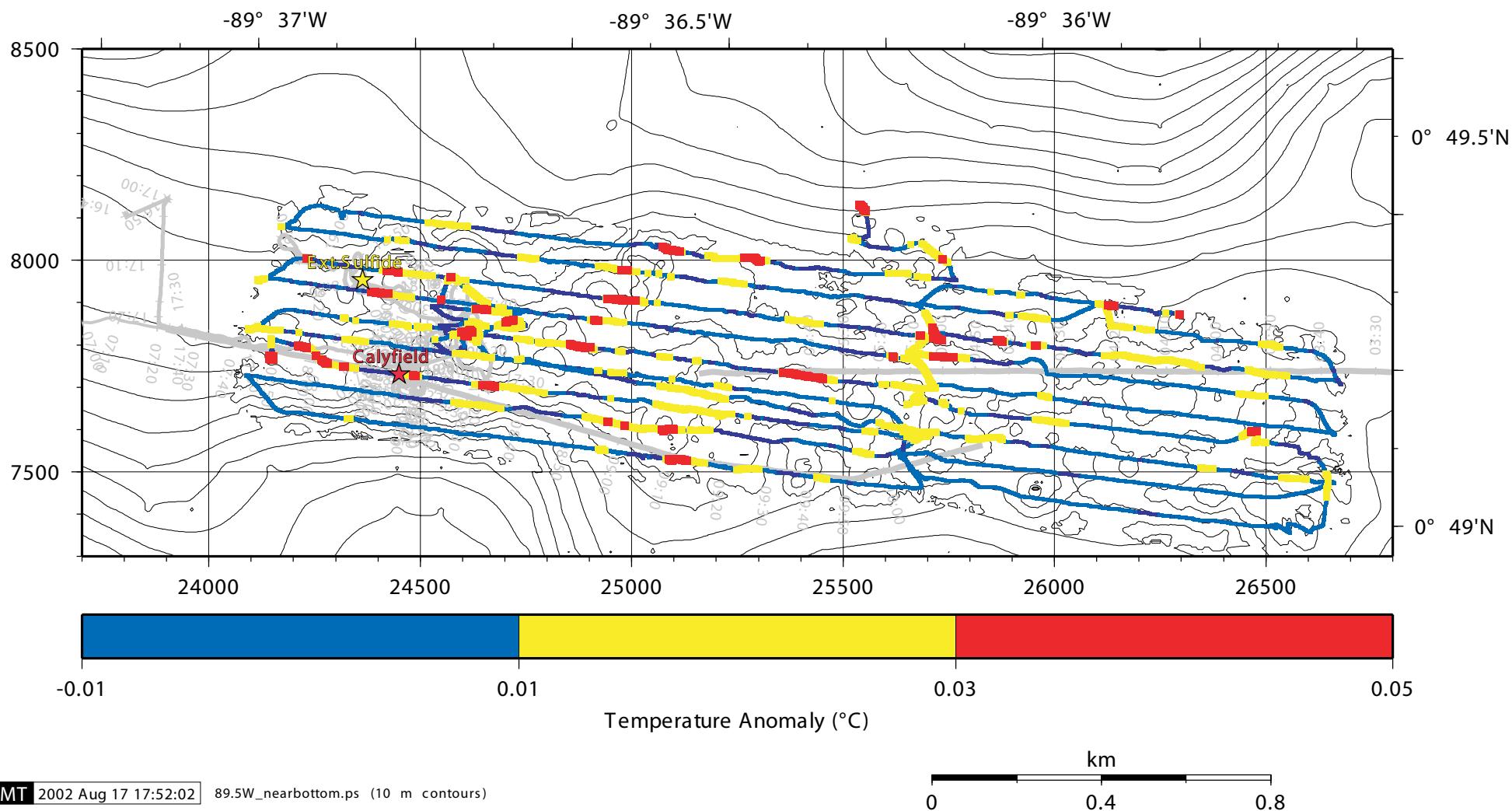
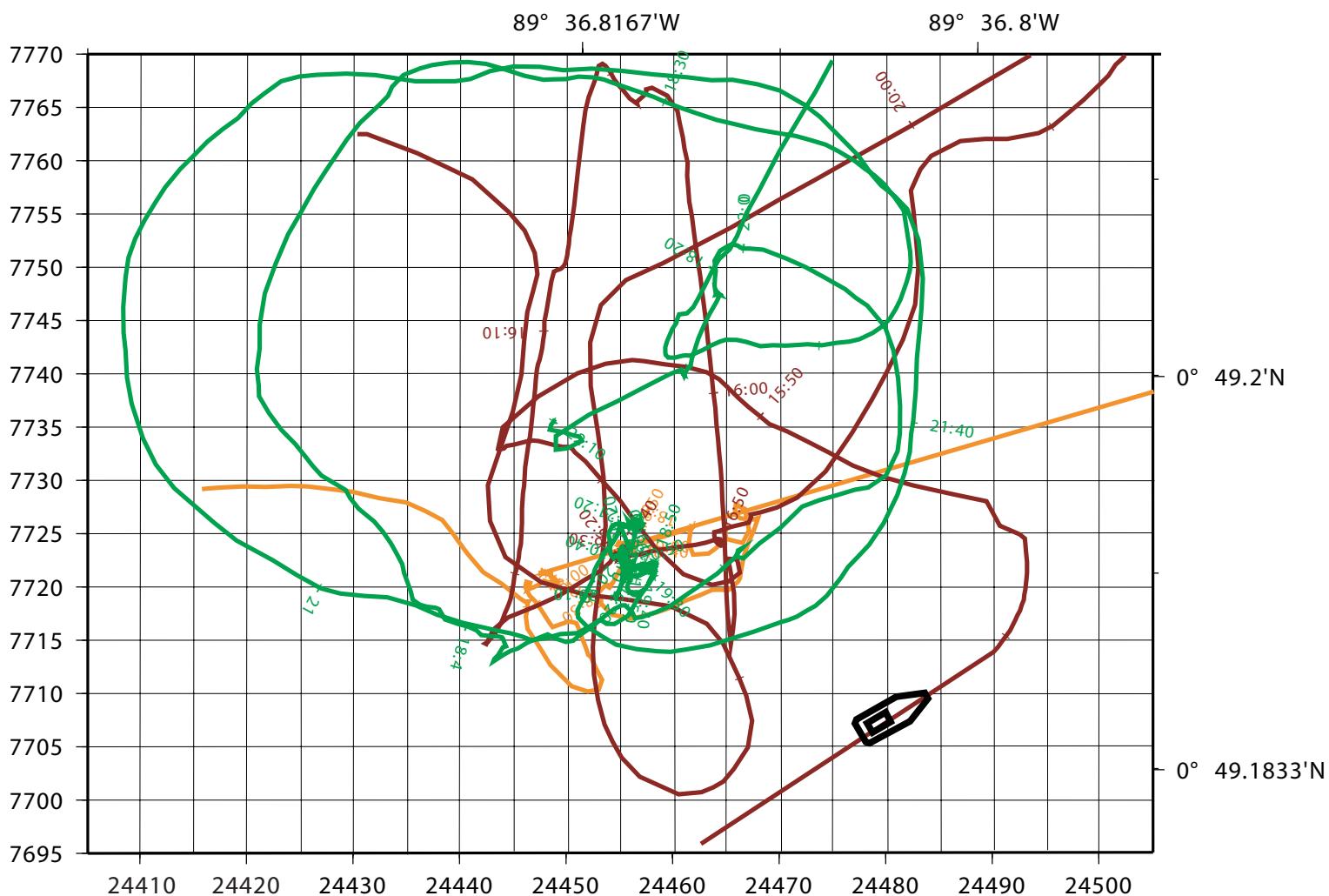
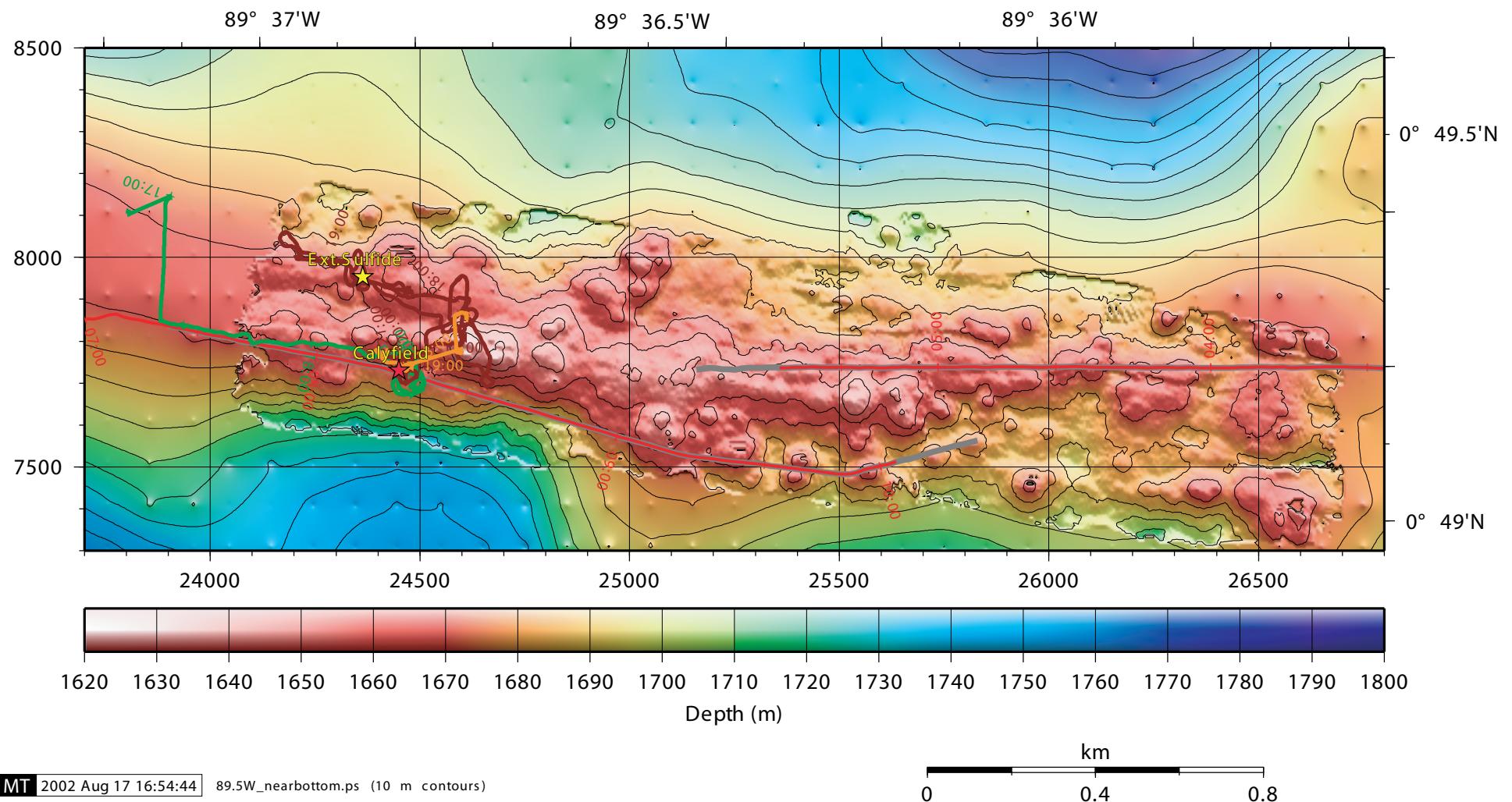


Figure 15. Temperature anomalies recorded by ABE in the 89.5W area. The large number and distribution of the small anomalies is likely caused by near-bottom oceanographic effects.



GMT 2002 Aug 17 17:14:14 Calyfield.ps

Figure 16. Preliminary navigation for Alvin dives at the newly-discovered Calyfield vent site. Calyfield is characterized by abundant clams (*Calyptogena magnifica*), mussels, and a new species of vent sponge. Dark green line is 3794; dark red is 3795; orange is 3796. Black polygon approximates the outline of Alvin.



GMT 2002 Aug 17 16:54:44 89.5W_nearbottom.ps (10 m contours)

Figure 17. ABE bathymetry map, embedded within lower resolution Seabeam2100 bathymetry. Alvin and camera tow tracks are shown. The newly-discovered Calyfield is indicated by the red star. Yellow star shows position of the extinct sulfid chimney and dead mussels field. Dive 3793 occurred to the east of this area; dark green line is 3794; dark red is 3795; orange is 3796. Alvin navigation represents doppler positions, as re-set with LBL positions by the Alvin Pilot during the dive. Camera tow tracks are in red. Navigaion was by lay-back position based on P-code GPS ship position. Thicker gray line ends show TowCam positions during descent and ascent.